

## FEDERAL COMMUNICATIONS COMMISSION

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## PUBLIC SAFETY NATIONAL COORDINATION COMMITTEE

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## TECHNOLOGY SUBCOMMITTEE

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THURSDAY  
MAY 30, 2002

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The Technology Subcommittee met in the Commission Meeting Room, Federal Communications Commission, 445 12th Street, S.W., Washington, D.C. at 10:51 a.m., Glen Nash, Subcommittee Chair, presiding:

MEMBERS PRESENT:

David Buchanan  
Steve Devine  
John Powell  
Robert Schlieman  
Michael Wilhelm  
Rich Murphy  
Jeanne Kowalski  
David Eierman  
Bob Speidel, Esq.  
Sean O'Hara  
John Oblak  
Carl Kain  
Glen Nash  
Tom Tolman  
Wayne Leland  
Norm Coltri  
Edward Dempsey

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MEMBERS PRESENT (continued):

Fred Griffin  
David Funk  
Bette Rinehart  
David Pickeral

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P-R-O-C-E-E-D-I-N-G-S

10:51 a.m.

MR. NASH: We have a couple of issues to deal with itself, we will continue on with any discussions on the wide band data that we may need. Secondly is we had a firm recommendation from TIA through Wayne Leeland relative to the encryption standard. We need to forward that on to the Steering Committee.

Thirdly, the FCC has asked us to discuss an issue relative to whether or not we should set a minimum signal strength standard for operations in the 700 MHZ band. And some discussion about what the impacts of that might be.

And then fourthly, I had a request to make presentation. I am not sure if they are here. So we may not have that so. All right, any other items people want to add to the Agenda?

With that, I guess Dave sort of continuity, we have stuff relative to this committee on the wide band data.

MR. BUCHANAN: Yes, just in case somebody

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1 new came into the room, in the interoperability  
2 meeting just before this, we decided that most of the  
3 interoperability requirements can be done at the lower  
4 through put rates that essentially will fit into a 50  
5 kHz channel. We are still reviewing and there may  
6 need to be some limited amount of higher through put  
7 for video.

8 It is up in the air. But basically what  
9 was came out of the interoperability is that we could  
10 give direction TIA that 50 kHz channel width for the  
11 basic wide band interoperability is all that is  
12 require. However, they also need to know the type of  
13 symbol rate, the QAM, whether it is 16 or 64. Or for  
14 the IOTA, the two ASK or the four ASK.

15 I have got a document here, and I don't  
16 think you have enough for everybody, Dave. Is that  
17 correct? This document is one Motorola is putting  
18 together to present to TIA, but John has looked it  
19 over and basically it is stuff that has pretty well  
20 got a consensus on what TIA is proposing. And I'll  
21 just read one paragraph out of the Executive Summary  
22 rather than trying to do it all.

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1 But this report concludes that the most  
2 optimal and acceptable trade off between effective  
3 interoperability with minimum complexity and  
4 development time is provided by the combination of 50  
5 kHz channel band width and the use of 16 QAM SAM or 4  
6 ASK for the IOTA. And just to explain that, there are  
7 two proposed standards. SAM, which is scalable,  
8 adaptive modulation.

9 IOTA, I don't have a clue what that stands  
10 for. Could you say that in the microphone.

11 MR. SCHLIEMAN: Isotropic Orthogonal  
12 Transform Algorithm.

13 MR. BUCHANAN: Okay. So those are the two  
14 proposed standards. Then going on, this pay load  
15 symbol constellation to form the base line  
16 interoperability, physical operating mode for the wide  
17 band interoperability channels. Further selection of  
18 a single physical modulations standard either SAM or  
19 IOTA is also required.

20 The SAM physical layer defining and  
21 performance standards are more mature than those for  
22 IOTA at this time. A suggested revision to the FCC

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1 90.548 Interoperability Technical Standards to add  
2 these provision for wide band interoperability  
3 channels is proposed. And basically, what they are  
4 asking us for is to decide on the modulation and then  
5 whether SAM or IOTA and is that right John? Do you  
6 want to come on up and address a little bit of this?

7 MR. OBLAK: Yes, John Oblak. I actually  
8 haven't had a chance to read completely that Motorola  
9 paper, but I have read the Executive Summary. And in  
10 general, it is the same recommendation that I will be  
11 bringing to the Steering Committee tomorrow in a  
12 presentation. And as I mentioned there are 18  
13 combinations of modulation types, band widths and  
14 symbol patterns that are available. And I believe what  
15 that document is recommending is consistent with what  
16 TR85 and TIA will be recommending tomorrow.

17 And that is, the 50 kHz channel band  
18 width. The mid symbol pattern and then a choice of  
19 one of the two types of modulations. So I believe  
20 that document agrees in general with TIA is going to  
21 present tomorrow.

22 MR. NASH: So I guess, will TIA be making

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1 a recommendation about the modulation type?

2 MR. OBLAK: Yes.

3 MR. NASH: Eventually or is that something  
4 you are looking for this committee to make a decision?

5 MR. OBLAK: I think part of the issue is  
6 that the choice of the modulation type is, it is not  
7 an obvious choice. I wouldn't expect that, let me  
8 state it a different way. Given the difficulty the  
9 TIA has in choosing based on technical merit, we  
10 expected that there won't be sufficient information  
11 for this committee to choose either. Our plan is to  
12 make a choice, based on the technical parameters that  
13 are at hand and present that choice to you. Certainly  
14 with your concurrence.

15 MR. NASH: As typical as the two  
16 modulations schemes are mutually incompatible?

17 MR. OBLAK: That is correct.

18 MR. NASH: And therefore, if we were to  
19 have interoperability a choice has to be made?

20 MR. OBLAK: Yes.

21 MR. NASH: By somebody?

22 MR. OBLAK: Yes. We are proposing to make

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1       that choice and bring it to you as a recommendation.  
2       And again for your concurrence.

3               MR. NASH: Do you foresee if you bring it  
4       forth as a recommendation is that going to be  
5       controversial recommendation to which if you will, the  
6       loosing party will exhibit significant objection to?

7               MR. OBLAK: I don't anticipate that. I  
8       don't believe that would happen. I would hope that  
9       wouldn't happen. But, again, I believe that the  
10      standards and TIA will go forward with both  
11      modulations being documented. We will make a  
12      recommendation from TIA that one be adopted for use in  
13      the 700 MHZ interoperability spectrum. And I believe  
14      there will be consensus on the TIA side when we do  
15      that.

16              MR. BUCHANAN: Would it help you, and I  
17      think we have enough information, certainly, we have  
18      enough I think to say that 50 kHz channel band width  
19      is acceptable as the standard with the caveat that we  
20      may have some applications that need higher through  
21      put and wider band width in the future. But, it is  
22      not something we can define right now.

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1                   MR. OBLAK:     We would appreciate that  
2                   position. We think that is the right choice. And you  
3                   know, if that be your desire, that would help us firm  
4                   up our direction a little bit.

5                   MR. BUCHANAN: I think we could also help  
6                   you with the mid-tier modulation symbol rate. Either  
7                   the 16 QAM or 4 ASK also. I don't think that is too  
8                   much of an issue. That puts it, I assume that being  
9                   in the middle means good compromise technically as to  
10                  through put and range and all of that.

11                  MR. OBLAK:   Exactly, that is our point.  
12                  That all of these give the best technical compromises  
13                  when looking at energy per bit and so forth. The  
14                  range that you will you get and modulation packing.  
15                  So we believe this is the best compromise. The only  
16                  thing we are not prepared to do at this point, and I  
17                  don't think we even have the data that would allow  
18                  anybody to make that determination is whether IOTA or  
19                  SAM is the better modulation choice. But that is  
20                  something that we and TIA plan to develop a position  
21                  for and bring it toward this committee.

22                  MR. NASH:    I still hear a different, is it

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1 16 QAM or 4 ASK?

2 MR. OBLAK: It would be, if we choose SAM,  
3 it would be the 16 QAM.

4 MR. NASH: So that decision is based upon  
5 what the appropriate modulation is?

6 MR. OBLAK: That is correct. Those are  
7 both the mid-level modulations and have approximately  
8 equivalent performance. So we are saying that of the  
9 scale ability of band widths and constellations, this  
10 represents the narrowest channel band width and the  
11 mid-packing of constellation. We believe that to be  
12 the best compromise.

13 MR. NASH: Okay, so so then I guess at  
14 this point then I would ask the committee is the  
15 committee comfortable with making a recommendation  
16 that TIA move forward with a 50 kHz standard using a  
17 mid-level data rate and a modulation scheme yet to be  
18 determined. Are we comfortable making that  
19 recommendation at this point in time? Open for  
20 comments.

21 MR. SCHLIEMAN: Bob Schlieman. I thought  
22 that David had stated that there would be some wide

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1 band applications at the higher channel widths to be  
2 defined in the future? Do we want to leave it the way  
3 it is or reduce it to single channel width?

4 MR. OBLAK: I think the only thing I would  
5 add to cover what you are saying Bob, is we recommend  
6 the 50 kHz, the mid-tier modulation, but also put a  
7 caveat that we may need to define a second high band  
8 width more through put. I guess it would a derivative  
9 of the standard.

10 The standard is going to cover all of this  
11 as I understand it. So, we could say, it wouldn't  
12 necessarily be in every radio, it would be for those  
13 mutual aid requirements needing the wider band width,  
14 the higher through put. But I think this could be, as  
15 Glen stated, the majority of applications for the  
16 majority of mobile data, RF modems out there. That  
17 this would handle it. We just need to caveat that we  
18 may define that there are some needs for the higher,  
19 which would be a separate radio that people would buy  
20 separately just do that for those that have that need.

21 MR. SCHLIEMAN: In that case, Glen, would  
22 your consensus be that the majority of applications we

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1 foresee are for 50 kHz channel?

2 MR. NASH: Well I think, I would refer  
3 that back to the interoperability subcommittee as to  
4 what they think the applications. Kind of what I  
5 heard this morning was that we know that there are 50  
6 kHz type applications at this point and time. And so,  
7 we are unclear as to what other applications may be  
8 there. And so, I think to move this forward to say  
9 that we need to have a 50 kHz standard is a known.  
10 Something, you know, standard that could operate at  
11 150 are not yet known or really definable.

12 MR. SCHLIEMAN: I thought, what I heard  
13 was, that the standard that both standards that TIA is  
14 considering are capable of doing 1500 and 150 in the  
15 one standard. And therefore, I am confused why we  
16 would need to specify single channel with the standard  
17 if the standard that they are working on can do all  
18 three and are -- for all three.

19 MR. OBLAK: Perhaps I could try to answer  
20 that. John Oblak. Certainly the standard includes  
21 all three modulations. All three, I should say all  
22 three band widths, all three constellations of

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1 modulation. And two different modulation schemes.  
2 But certainly we can foresee that not all vendors will  
3 choose to implement all of those. We feel there is a  
4 certain advantage to having a limited number of  
5 combinations to enhance interoperability to allow  
6 manufacturers to focus on a particular implementation.

7 I expect that there will be manufacturers that will  
8 implement all of the modulations and all of the  
9 scalabilities. We are also anticipating there will be  
10 manufacturers that won't.

11 We feel that from the standard making side  
12 of things that the decision is not that terribly  
13 important. But from a manufacturing side of things,  
14 and what the manufacturers will produce, we feel it is  
15 an important decision. And we feel that just as when  
16 we talked about Project 25 and the various modes that  
17 were available for data for example. That we limited  
18 that to a specific number so that manufacturers could  
19 focus on implementing those specific modes. We feel  
20 the same for wide band data.

21 That while the standard will cover all of  
22 them, it will help the manufacturers and the product

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1 availability if interoperability mode is limited to a  
2 specific number.

3 MR. NASH: Sean?

4 MR. O'HARA: Sean O'Hara. Syracuse  
5 Research Corporation. This actually kind of I guess  
6 goes to John and TIA. Since both the 4 ASK 16 QAM  
7 modulations are so similar in performance and the  
8 difference are -- in that they are in areas like  
9 channel tracking performance versus pilot overhead or  
10 peak average power type things or PA linearity. I am  
11 wondering if TIA's decision is also going to include  
12 which one of the standards and which one of the  
13 modulations brings with the IPR or patent licensed  
14 rights with them. Because obviously that encourages  
15 the multi-vendor ability equipment in the band.

16 MR. NASH: I think, if I can answer for  
17 you John. You know certainly TIA's requirements you  
18 know if you are publishing a standard requires that  
19 IPR be made available under fair and reasonable terms  
20 to any other manufacturer choosing to develop that  
21 technology. So, I guess are you saying the decision  
22 be based on the number of IPR's or the cost of those

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1 IPR's or?

2 MR. O'HARA: I know at one point and time  
3 SAM had a number of IPR identified and the IOTA  
4 modulation had none. So yes, the number and type of  
5 IPR's I think perhaps might be a consideration.  
6 Because fair and reasonable is yet to be defined.

7 MR. NASH: John, I will let you deal with  
8 that one. I am not sure you can use that.

9 MR. OBLAK: I guess I -- probably the only  
10 thing I can say about that is, TIA does have an IPR  
11 policy. All of those that are participating are aware  
12 of the policy. I don't know that IPR in itself will  
13 be a decision making criteria. In fact, we typically  
14 don't use that as a criteria. But what we do look for  
15 is certainly the willingness of the IPR holder to  
16 license technology under fair and reasonable  
17 conditions and perhaps that is the best I can say  
18 about that.

19 MR. NASH: Okay.

20 MR. BUCHANAN: I think it still comes down  
21 to that for the radio that is bought in quantity by  
22 all the public safety agencies, we are still talking.

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1 And this goes back to the interoperability  
2 discussions, the 50 kilohertz meets 90% of the needs  
3 that we can foresee at this time. It is still  
4 reasonable to use the mid-tier modulation rate,  
5 symbols. So I think we can still go ahead. I just  
6 think we need to just have TIA understand that we may  
7 come back and say, in addition to that there needs to  
8 be in every radio if you are going to do these other,  
9 whatever they maybe applications for mutual aid that  
10 require more through put. We are going to come back  
11 and say it needs to be 150 kilohertz band width for  
12 instance. And the mid-tier rate or the high rate,  
13 whatever it might be. But that is going to be based  
14 on what we can determine the applications are and the  
15 flexibility. So think we can still go ahead with what  
16 you said Glen, just with that further understanding.

17 MR. NASH: The way I have it at the  
18 moment. Is that the need for interoperability  
19 standard be defined at this point as supporting a 50  
20 kilohertz channel operation, operating at a mid-level  
21 symbol rate with a modulation scheme to be recommended  
22 by TIA. Future ability to expand to 150 kilohertz

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1 operation is desirable. Does that cover what  
2 everybody's understanding is of the discussion so far?

3 Can we make that a recommendation to go forward to  
4 the Steering Committee? Or are we not comfortable in  
5 doing that yet?

6 MR. BUCHANAN: Sounds good to me.

7 MR. NASH: Somebody want to make the  
8 recommendation. And we can't vote on it officially,  
9 but.

10 MR. BUCHANAN: Well I'll make the  
11 recommendation on what you just stated.

12 MR. NASH: I will ask, you know do we have  
13 consensus on that statement? Anybody object the  
14 chairman declaring consensus? It would appear we have  
15 consensus. So I thank you all.

16 Okay next item, and Wayne I am glad to see  
17 you walked in the room. Wayne had submitted a letter.

18 And I guess actually you had wrote it to Cathy  
19 relative to the encryption standard. Again this is  
20 something that this committee has been discussing and  
21 re-discussing and re-discussing and re-re-discussing  
22 for several meetings. Is relative to an encryption

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1 standard for operations on the interoperability  
2 channels which makes this somewhat of a difficult  
3 point is that encryption is not required on the  
4 interoperability channels. However, if you are going  
5 to encrypt on the interoperability channels, then you  
6 need to do so in a standardized form.

7           There has been a lot of discussion about  
8 what that standardized form should be. We have gone  
9 from DES to triple DES to AES back to DES and I think  
10 we are now back to AES as the recommendation for the  
11 encryption standard to be used on the interoperability  
12 channels if you use encryption.

13           That standard is now incorporated into an  
14 ANSI standard numbered ANSI TIA EIA 102.AAAD.  
15 Specifically Annex C. If I got all of those right.  
16 Well you know, and so will open up for discussion as  
17 to this committee forwarding a recommendation that we  
18 adopt that as the encryption standard to be used on  
19 the interoperability channels if encryption is  
20 implemented. Any discussion. Yes, go ahead Wayne.

21           MR. LELAND: The current rules are written  
22 in by the FCC. So that there are regulations that

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1 says if it is encryption you must use DES. And so  
2 this would be, if it goes through the NCC process,  
3 would be a recommendation from NCC to the Commission  
4 to change the rules. So I am sure that there will be  
5 an NPRM process or whatever process that is in there.

6 The second point, and you have touched on  
7 it. Is that the new standard is the one that  
8 currently is an ANSI standard. The one in the rules  
9 is not. It never made it to an ANSI Standard level.  
10 But it was a TIA standard.

11 MR. NASH: Any other comment?

12 MR. BUCHANAN: Just a question to make  
13 sure I understand. Then the AES now is an ANSI  
14 Standard? And Wayne answered yes on that.

15 MR. NASH: Okay, so the recommendation  
16 will be forwarding is that the NCC request the FCC  
17 modify the rules to require use of AES encryption on  
18 the interoperability channels if encryption is  
19 implemented.

20 MR. LELAND: Replacing the current rule to  
21 use DES. You probably need the TIA document number  
22 to.

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1 MR. NASH: Okay, to replace the current  
2 requirement for DES encryption. Okay, AES is defined  
3 in ANSI TIA EIA102.AAAD Annex C. So what I got the  
4 NCC request the FCC modify the rules to require the  
5 use of AES encryption on the interoperability channels  
6 if encryption is implemented to replace the current  
7 requirement for DES encryption.

8 AES is defined in ANSI TIA EIA 102.AAAD  
9 Annex C. Is that acceptable to everyone on the  
10 committee? The Chairman seeks to declare consensus on  
11 this issue. Anybody object to that. Seeing none, we  
12 have consensus on that recommendation.

13 MR. MURPHY: If the Steering Committee  
14 accepts the recommendation, it would be useful to the  
15 commission to have a copy of the standard forward with  
16 the recommendation.

17 MR. NASH: We can get a copy. I am sure.  
18 Okay so that takes care of the second thing. Third  
19 thing we wanted to discuss and I have had a request  
20 from the FCC that we discuss is one of the concerns  
21 that this committee has had and others have had is,  
22 really relative to potential interference from

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1 adjacent band users and in particular the commercial  
2 band. And the suggestion has been made as to an  
3 alternative approach to dealing with that. Any time  
4 you are looking at an interference situation, there is  
5 two ways to approach it. You can reduce the  
6 interfering signal or you can increase the desired  
7 signal. And they would like us to explore the concept  
8 of increase in the desired signal.

9 To that end, the suggestion has been made  
10 that increasing the minimum design signal level be  
11 increased from the 40 Dbu that is typical of public  
12 safety systems today. That that be increased to a  
13 design signal level 50 or 52 dBu. We will open that  
14 up for discussion. Pros and Cons. Whether it is  
15 advantageous to increase the signal level or not.

16 MR. BUCHANAN: I'll make a comment. The  
17 con as I see it is that we can't pack the channels  
18 nearly as well. And we are not going to be able to  
19 accommodate as many users that way. Because it is  
20 going to be much harder. Well I don't know. The  
21 ratios, I guess the interference stays the same, but I  
22 don't know how that helps when you add in the

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1 interference from out of band people to. Dave is up  
2 at the microphone, maybe he's got a comment.

3 MR. EIERMAN: David Eierman, Motorola. Is  
4 the reason fro going from 40 to 50 dBu to basically  
5 say all systems have to accept 10 MR. BUCHANAN: of  
6 interference. Basically you are raising a noise floor  
7 by 10 MR. BUCHANAN: so all systems have to be designed  
8 you know with a 10 MR. BUCHANAN: higher noise floor.  
9 Is that what the purpose of this is?

10 MR. NASH: Again, it is in part dealing  
11 with comments and suggestions that have been made from  
12 people coming from the commercial side saying that  
13 public safety does not design their systems for  
14 adequate signal levels to protect itself from  
15 interference. So you know, in a way you are right  
16 David. We are saying that we are going to design our  
17 systems to accept a 10 MR. BUCHANAN: higher noise  
18 floor.

19 That has implications, certainly in the  
20 design of our systems of either requiring higher  
21 output levels from our own transmitters, essentially  
22 10 MR. BUCHANAN: higher. Or requiring more sites in

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1 order to attain the higher received signal levels  
2 which has a cost impact to public safety also. So  
3 it is, when you look at it, David from your in band  
4 viewpoint, I am not sure that it gains us a whole lot.

5 I am not sure that it costs a whole lot because we  
6 are looking at increased signal levels, but in order  
7 to do that, you are also looking at increased adjacent  
8 channel noise levels by that same amount. So if  
9 everybody ramps up 10 MR. BUCHANAN:, what have you  
10 accomplished? Potentially the advantage might be  
11 relative to the adjacent band users given us some  
12 additional protection. That is kind of an unknown at  
13 this point. Sean?

14 MR. O'HARA: Sean O'Hara, Syracuse  
15 Research Corporation. You know as David said, that 10  
16 MR. BUCHANAN: rise in the noise floor is really, let's  
17 just move towards an interference limited design. And  
18 not everybody want to do that. Not everybody needs in  
19 building portable coverage. Which is another reason  
20 to go up to a 52 MR. BUCHANAN:. And terrain that is  
21 not flat, the option is not to raise the power output  
22 of anything, the only option is to put sites in and

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1 quite a few more sites in. For state systems that  
2 have to work and duplicate coverage and overlap  
3 coverage with local and municipals systems. There is  
4 no way they can afford to put that kind of  
5 infrastructure investment in for system to support  
6 mobile operations. That would have very, very  
7 detrimental impacts to the system such as New York,  
8 Ohio, and Michigan and so on.

9 Furthermore, raising everyone's signal by  
10 12 MR. BUCHANAN: is going to raise everybody's  
11 intermods by 36 MR. BUCHANAN:, conceivably. I mean we  
12 are going to create a whole lot of problems within our  
13 own systems when we start mixing and matching these  
14 types of systems. I think if we are going to, there  
15 maybe cause to do something like this. But I think we  
16 need to partition the spectrum and to people that are  
17 going to design with 52 dBu service areas. And the  
18 people that are going to design in the 40 dBu services  
19 and try not geographically mix those systems together.

20 Or else we are going to have similar problems to what  
21 we are trying to get away from with Nextel.

22 MR. LELAND: Wayne Leeland with Motorola

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1 and Chair of the Private Radio Section of TIA. Let me  
2 just make a few comments. I was at the meeting at the  
3 FCC when we went in to discuss this. And our proposal  
4 initially was to and still is from a TIA standpoint to  
5 reduce out of band emissions of any common carrier or  
6 commercial entity to a level that would only cause a  
7 3 MR. BUCHANAN: rise in the noise floor. During the  
8 discussion, there were several other that we were  
9 asked for what other means could help alleviate the  
10 situation. This was one of them, raise the signal  
11 strength of the desired signal would help to do that.  
12 And receiver standards were discussed etc.

13 I think the commission is looking for more  
14 than something either in addition or instead of  
15 limiting chimerical carriers. So you can talk about  
16 the 10 MR. BUCHANAN: noise floor, but as I see it, it  
17 is going to be there guys. So if you don't like  
18 this, you are going to give up the band. You know at  
19 least in the major metros where the cellular carriers  
20 are. Depending on what rules comes out in the  
21 Commission. So I don't think you have a choice,  
22 unless you just say that it is unacceptable and we

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1 want to make sure the carriers are limited to that  
2 level which only goes to the 3 MR. BUCHANAN: rise  
3 aggregately, by more than one carrier, so.

4 MR. BUCHANAN: Glenn, could I?

5 MR. NASH: Go ahead David.

6 MR. BUCHANAN: I guess, I have two  
7 concerns as I sit here and think about it. One would  
8 be that I guess you could apply this to the urban  
9 areas. But I know in the west in a lot of the rural  
10 areas trying to get 50 DBMU of signal is going to be  
11 real tough. You can't get enough sites from  
12 environmental reasons. So I think it would have to be  
13 a two tier. The other thing is the commercial people  
14 typically don't put in any coverage there and they  
15 don't have any signal there and probably won't for the  
16 same reasons.

17 It is hard for them or maybe it is just a  
18 long interstate coverage. But if you are a  
19 county/state or whatever, you have got to cover all of  
20 your area or nearly all of it. You just can't ignore  
21 it as the commercial people can. So I think if we  
22 went ahead, we would have to have some kind of two

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1 tiered thing.

2 The second issue is has there been any  
3 engineering study as to what happens. We say the  
4 rations are the same between, I mean if everybody  
5 jumps up to 50, well that is going to be 10 MR.  
6 BUCHANAN: higher on their interference to their --  
7 channel users. But what about when you add in the 10  
8 MR. BUCHANAN: riser, whatever it is from the  
9 commercial people. How does that affect everything?  
10 Does that again force us to say, no we can't put in  
11 that much signal into our co and adjacent channels  
12 along with the interference would lead us right back  
13 to not being able to pack and use the channels  
14 efficiently from a re-use standpoint. I think we need  
15 to have some analysis done on that before we can make  
16 a decision.

17 MR. SCHLIEMAN: Robert Schlieman. I think  
18 there are a lot of negative aspects to this. Not the  
19 least of which is the costs to put in an interference  
20 limited system. The fact that the commercial people  
21 do this, but they receive revenue to off set the cost  
22 of it, doesn't imply that governmental or public

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1 safety systems have those kind of resources available.

2 I haven't seen any of the proponents put forth a  
3 impact statement as to what would be required in terms  
4 of additional cost and siting with all of the  
5 attending issues of additional citing that we love and  
6 enjoy so much.

7 MR. EIERMAN: David Eierman, Motorola.

8 You know I guess that everybody recognized that a 50  
9 DBMU contours smaller than a 40 DBMU and it is on the  
10 order of well 10 MR. BUCHANAN: probably only 30%  
11 smaller. As far as you know of raising powers. It is  
12 a little hard to raise a power of a 3 what portable to  
13 30 watts and carry it around. And base station wise,  
14 we do have ERP limits. So you are not going to raise,  
15 you are not going to get 3 or 6 MR. BUCHANAN: that  
16 you can raise the outbound link powers.

17 The interference is also going to affect  
18 base stations receivers. So raising the noise floor is  
19 actually going to decrease the range. And you are not  
20 going to, even with max ratio and sectorized antennas.  
21 You are probably not going to get the 10 MR. BUCHANAN:  
22 back. So by allowing the noise floor to go up by 10

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1 MR. BUCHANAN:, the result is going to be that  
2 coverages are not only going to be smaller then they  
3 are today, and there really is not much you can do,  
4 system design wise to get that 10 MR. BUCHANAN: back.

5 You probably will never get all 10 MR. BUCHANAN: of  
6 it back.

7 Interference wise or you know, co-channel,  
8 adjacent channel, yes. If everybody has got the same  
9 criteria it is basically the spacing shouldn't change  
10 much. It is purely this interference issue where you  
11 have got to accept the fact that now you are using  
12 more frequencies than you were before. Because you  
13 have smaller radios, you have to put more frequencies  
14 in. They end up being spaced closer together. So  
15 there is some impact in that regard.

16 MR. NASH: You're right. We certainly  
17 need to be concerned about coverage is a two  
18 directional issue. It isn't only outbound from the  
19 base station. It is also inbound from the mobile  
20 units. And you are limited in your ability to  
21 increase the ERP of mobile units.

22 MR. SCHLIEMAN: Glenn, I would say that

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1       this is an unfortunate recommendation or Band-Aid to  
2       solve a problem that comes from this interleaving of  
3       interference limited and noise limited design  
4       technologies or -- and the real solution to the  
5       problem is to separate those different types of  
6       operation. By adding noise, it is sort of like having  
7       a high fi war. If you turn your speaker up. Then the  
8       next guy turns his speaker up and pretty soon you have  
9       lost your hearing. But you know it is loud. And you  
10      could match your signal to the noise ratio. And say  
11      well I got the signal and the noise ratio. It is just  
12      that I can't hear anything anymore, because my ears  
13      are all screwed up.

14                   MR. LELAND: Bob, that is an issue at 800.  
15      At 700 they are separated.

16                   MR. NASH: We are not worried about  
17      channel interleading.

18                   MR. LELAND: It is not interleading here.  
19      It is outer band emissions, plan and simply. Just  
20      roll off from the commercial guys.

21                   MR. NASH: But I agree with the cause. At  
22      what point do you start chasing your tail?

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1 MR. LELAND: Absolutely.

2 MR. NASH: I increase mine to improve  
3 things but it could make it worse for you. So you  
4 increase yours to improve things, which makes it worse  
5 for me.

6 MR. MURPHY: Are you sure you are not  
7 going get interleading at 700. For example, somebody  
8 implements a TETRA system in the same area as somebody  
9 is trying to operate a noise limited system?

10 MR. LELAND: I don't think that will be a  
11 problem, that is public safety system. It is  
12 frequency coordinated, etc., etc. That is not the  
13 issue. I mean when frequency coordination is done,  
14 and TSB 88 will cover the different modulations and  
15 those kinds of things for design parameters. So I  
16 don't think that is an issue. The issue is the  
17 unknowns and the uncontrolled relative to public  
18 safety. It is the commercial guys which you don't  
19 know what they are, who they are, when they are. And  
20 they change frequencies all the time.

21 MR. NASH: Are there no significant  
22 advantages to public safety by increasing the received

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1 signal levels?

2 MR. SCHLIEMAN: I don't think I would say  
3 that there are no advantages. I would say that in  
4 balance, it is not advantageous. The only solution  
5 that has been put forward so far, the advantage that  
6 has been put forward is for in building penetration  
7 being easier at the higher signal levels. But of  
8 course that goofs up your spectrum re-use. And it  
9 impacts everybody else because one person got an  
10 advantage for his in building penetration. It could  
11 be solved another way.

12 MR. NASH: But the reason for you that you  
13 get improved building penetrations because of the  
14 losses going into the building, and therefore within  
15 the building you have the lower signal levels.

16 MR. SCHLIEMAN: Because of the higher  
17 signal going into the losses going into the building?

18 MR. NASH: Understood, but let me finish  
19 here. If you are now inside the building and still  
20 have to face the higher noise levels from the  
21 commercial services, then they also be inside the  
22 building, have we gained anything in actual building

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1 penetration here or do we have to further increase the  
2 signal level in order to obtain 50 dBu of coverage  
3 inside the building. So you know, it is ==

4 MR. SCHLIEMAN: Well the other issue is  
5 just because you have a higher signal going into the  
6 building doesn't mean that that portable unit can get  
7 out of the building. You know that is typically why  
8 we sometimes use Radiax systems and those sort of  
9 things in buildings rather than increasing the signal  
10 level to begin with.

11 MR. NASH: David?

12 MR. EIERMAN: Yes, David Eierman,  
13 Motorola. I think TIA has already looked at this and  
14 said, worst case they would accept that the  
15 interference level being equal to the noise floor or  
16 the receiver. Which is basically -- take 3 MR.  
17 BUCHANAN: degradation. And if you look at the  
18 simplified pre-coordination appendix to the  
19 guidelines, Appendix K or O, whichever letter it is,  
20 when Bernie Olson wrote that, he already included that  
21 3 MR. BUCHANAN: in there because that TIA discussed  
22 this well over a year ago, probably 18 months ago.

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1 Big discussion in a TSB 88 Committee, TR-18.

2 So, recognizing that there is going to be  
3 noise, TIA says yes, we can accept so much. But this  
4 10 MR. BUCHANAN: causes a significant change in the  
5 noise war and has a significant affect on reliability  
6 of system design. You know, basically, I look at it  
7 as raising the noise floor. So you know, if you can  
8 talk to the building today, with noise limited, and  
9 you raise the noise floor by 10 MR. BUCHANAN: you  
10 can't talk into the building anymore. And the issue  
11 is going to be, it is like we will be able to design  
12 the system and I will talk into the building today,  
13 some carrier is going to come and put a system on top  
14 of the building and all of a sudden it doesn't work.

15 MR. NASH: That was the point I was trying  
16 to make. If the noise floor goes, the noise floor  
17 goes up.

18 MR. SPEIDEL: Bob Speidel. Glenn, I am  
19 not disagreeing with really what you are saying, but I  
20 think, I was just talking with Wayne, the question  
21 that has really been asked to us, the sense that I am  
22 getting of the discussion here, is there is not a 25

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1 words or less answer to this question. There are a  
2 number of issues, and I don't think even the TIA  
3 group, Bernie, has looked at it very closely from a  
4 non-700 standpoint.

5 I talked with Wayne and I said I think  
6 really what we can go back to the Commission right now  
7 is that, well maybe as you indicated there doesn't  
8 appear to be significant advantages, we think it  
9 really needs to have a more technical analysis or  
10 detailed look at it. And I would offer certainly to  
11 go back to the PRS meeting and we can have Wayne's  
12 group and say, hey this is something that TIA should  
13 maybe take a look at. Expand the scope the of that  
14 committee we had working at 700 issue. And I think  
15 this whole idea about increasing the signal level  
16 almost came up as a sigh when we were having that  
17 meeting which was theoretically on 700.

18 But I think what we really can go back to  
19 the Commission right now and say hey, there may not be  
20 much preliminary indication, there might not be much  
21 advantage, but we think there needs to be more  
22 analysis and offer that we would do this from TIA

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1       standpoint.

2                   MR. NASH:   Wayne, is that something TIA is  
3       willing to take on?

4                   MR. LELAND:   We've got the right people  
5       here.   We have got John and I am sure that we would  
6       take that on.   Because, you know Bob is right, it is  
7       not a simple do A and everything gets solved.   That  
8       has come up here.   It is a balance of several  
9       parameters.   And it is all of those trade offs and you  
10      have got to come to the right --.

11                   You may want to for this meeting to take  
12      Bob's suggestion and ask that TIA look at this and get  
13      back to you before the next NCC meeting.   Which is  
14      when, next September?   Which I think we should be able  
15      to do.   Everybody nodding their head.   Otherwise I get  
16      my hammer out and I beat them.   And secondly, you may  
17      want to, or maybe you don't, but you may want to say  
18      raising the noise, raising the desired signal level  
19      may be a that should be left on the table as an option  
20      for system designers, pending what TIA comes out with.

21                   You may also want to strongly endorse,  
22      limiting out of band emissions by whoever wins the

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1 auction in that spectrum. I mean that is the net we  
2 believe that is the -- cause. These other things are  
3 defensive. Given that that rit cause is going to take  
4 place, what can you do. Well you can design nil  
5 receivers then you don't get cross band, you don't get  
6 806 coupled with 746 radios. And you can raise the  
7 signal strength which you get all these other  
8 problems. But the root cause the potential  
9 interference from out of band emissions of the auction  
10 winners in the adjacent 700 MHZ spectrum.

11 MR. NASH: Now earlier, I heard a  
12 suggestion that we perhaps have a Region A, Region B  
13 standard. You now, urban/suburban rural somehow, you  
14 know separation between the two. Because I will admit  
15 in trying to deign the suburban rural type systems.  
16 Having to design it for higher signal levels is going  
17 have a significant cost impact on the number of sites  
18 that would have to be implemented and the potential  
19 problems of not being able to implement the additional  
20 sites because of other concerns that you get into, but  
21 Mike brings up that we chastised Michael yesterday by  
22 another one of your cohorts. All of the NEPA

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1 requirements with the FCC is putting on us also. So,

2 MR. LELAND: We can look at those aspects  
3 as well Glen with the TIA. The only comment I would  
4 make is with what we are learning now in 800 and 700  
5 without some kind of solution here, it is going to be  
6 difficult for system designers and manufacturers to  
7 come up with 90 guarantees or whatever. So it is  
8 going to make life thought unless you have some tools,  
9 like raising a signal strength or whatever. But it is  
10 not a simple issue.

11 MR. NASH: Norm?

12 MR. COLTRI: Norm Coltri, RCC Consultants.  
13 Basically what we are doing is masking a problem and  
14 I really don't think masking is the right way to solve  
15 a problem. But, I think it is good if we can do some  
16 further research into it. Also I think Michael  
17 brought up a very good point that I think deserves  
18 some additional consideration by the committee, about  
19 the 700 band. And whether mixing technologies would  
20 be causing the same type of problem. And I think that  
21 is a definite possibility. That if we do get into a  
22 situation where we are masking the signal levels by

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1 having cellular type operations intermixed with noise  
2 limited type of operations within the same segment of  
3 the 700 band, public safety could be causing problems  
4 to itself. And I think it might be something to look  
5 at where we may suggest that the different  
6 technologies start at different ends of the band and  
7 move into the center. Rather than intermixing the  
8 different technologies within the same band. I know  
9 it was mentioned we have frequency coordination is  
10 supposed to solve that problem, but, maybe taking a  
11 proactive approach at the beginning by segregating the  
12 technology at 700 may be a way to off set some of the  
13 potential problems that might develop.

14 MR. NASH: Other comments? Norm, I  
15 understand and I too have concerns about mixing  
16 technologies. I kind of have to fall back though on  
17 my experience in government of in trying to justify  
18 and get funding for a new system, and through the  
19 entire, if you will, life cycle of actually installing  
20 a new system. The money people want to have assurance  
21 that you have the spectrum in order to get the money  
22 and so you find yourself, first getting the spectrum,

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1 then getting the money. Then going out to bid, which  
2 defines the technology you are going to use. Which  
3 now puts you back in what you are suggesting of going  
4 back and asking for different spectrum because the  
5 technology isn't in the appropriate part of the band.

6 You know it is not going to be an easy  
7 thing to try to deal with. And certainly the  
8 frequency coordination issues in this band where we  
9 are looking at having some significantly different  
10 technologies is a new challenge for us. And I am not  
11 sure how to approach it.

12 MR. COLTRI: You are correct in your  
13 description of how things were done in the past. But  
14 I think the regional planning committees have to  
15 change a little bit of the way they are operating. I  
16 think there has to be some innovations. The original  
17 planning committee knows a block of spectrum that they  
18 have to work with and they know a certain number of  
19 channels are available for assignment in their area.

20 When an agency comes to them, they can  
21 block out a certain number of channels, not in any  
22 specific part of the band, but just in a number we

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1 will give such an agency five channels and they mark  
2 it in their book. And they keep track of those five  
3 channels, not is specific RF, but in channel blocks.  
4 Let the agency go through their procurement process,  
5 their fund acquisition process. Then come back to the  
6 committee later and say okay, I would like to turn  
7 these five channel blocks into RF frequencies. The  
8 committee now assigns the frequencies based on the  
9 technology.

10 So there is ways to work around this.  
11 This is not the way we are normally doing business,  
12 but it is possible to make it work. This also gives  
13 the committee better control over the frequency  
14 because if an agency fails to get the funding or fails  
15 to procure the system, they haven't assigned an actual  
16 FCC license. It is being held at the committee level,  
17 not at the FCC level. And it is easier to do a take  
18 back. So there are a lot of pluses in doing it that  
19 way. But it does require more work on the part of the  
20 committee on more work on part of the database to  
21 maintain frequency blocks rather than actual RF  
22 channels.

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1                   MR. NASH:   And David correct me, we sort  
2 of got into the discussion about 2 years ago when we  
3 were talking about receiver standards. And one of the  
4 things that we came up with, was well, it didn't seem  
5 to make a lot of difference because the transmitter  
6 standard was a -- as to the amount of noise that could  
7 be put into the adjacent six and quarter kilohertz  
8 channel. And so the receiver standard wasn't too  
9 critical because the burden was placed on the  
10 transmitter regardless of what type of modulation or  
11 band width it had. Is that a correct recollection?

12                   I am looking at David Eierman here who is  
13 trying to think back two years.

14                   MR. BUCHANAN:   I'll throw in mine. My  
15 understanding is that TSB 88 process takes care of  
16 those issues of different, it defines the ration  
17 needed for the different types of technology. So it  
18 becomes a mute issue.

19                   MR. NASH:   But TSB 88 requires you now to  
20 go back. In order to implement TSB 88, you have to  
21 know what the technology is in each of the two  
22 channels that are being considered.

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1 MR. BUCHANAN: Right.

2 MR. NASH: Which gets us back into this  
3 problem of the reality of how public safety systems  
4 are funded, designed and implemented.

5 MR. COLTRI: Norm Coltri again. One of  
6 the biggest problems we are seeing with the 800  
7 interference is not as much out of band as it is  
8 receiver overload. Where a receiver moves into an  
9 area which is very close to one of the cell sites. It  
10 is pumping out a lot of RF to get coverage into the  
11 immediate vicinity, the receiver loses sensitivity  
12 because of front end overload.

13 That type of interference is going to be  
14 present no matter what we look at as far as, we could  
15 be megahertz away and still have receiver front end  
16 overload. So it is not something that we are going to  
17 be able to do an analysis of that site based upon the  
18 TSB 88. Because we are looking at a system that is  
19 not specific to an RF frequency, but to a general  
20 overload of a multitude of RF channels at a specific  
21 site putting out a lot of RF power. And having those  
22 sites dotted all over the coverage area of a noise

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1 limited system.

2 And if we have that same thing in public  
3 safety, where we have a cellular type of system, for  
4 example, a city has a cellular type of system. They  
5 put in a TETRA type system. And they populate that  
6 city with maybe 50 or 60 sites. Each one covering a  
7 radius of two or three miles with a lot of RF to get  
8 in building coverage. And now the county has a noise  
9 limited system. Well every time one of the county  
10 cars is in the city and passes one of those city  
11 cites, it is going to have front end overload. And  
12 the only way to really get away from that is to have  
13 the system separated by enough frequency separation so  
14 that we don't have that problem. And I am thinking  
15 that if we start at the each end of the band, we would  
16 at least have a shot of doing that. Without having the  
17 technology separate it, intermixing the technology,  
18 the overload is going to be there.

19 MR. BUCHANAN: That's getting away --

20 MR. NASH: Yes, it's getting away from the  
21 question here. Any other questions or any other  
22 comments? Kind of what I gathered is the, you know,

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1 the consensus, short answer here. It is not a simple  
2 answer. Raising the received signal level is going to  
3 resolve our interference problems. There are several  
4 factors that must be balanced. Nonetheless on the  
5 surface, it does not appear to offer a significant  
6 advantage in the operation of public safety systems.  
7 And that at this point we recommend referring it to  
8 TIA for technical review and comment. Is that the  
9 general? Can I get clear consensus on --

10 MR. SCHLIEMAN: Yes, and I would add also  
11 in addition to the analysis include impact on public  
12 safety. In the larger sense of how much more is going  
13 to be required in siting and so on, costs.

14 MR. LELAND: Cost you can't do, a number  
15 of sites and things we can't do.

16 MR. NASH: okay, so if the analysis  
17 included discussion of the impact of the design of  
18 public safety systems?

19 MR. LELAND: Why don't you also add Glen  
20 to the completed prior to the next NCC meeting in  
21 September.

22 MR. NASH: That is fine by me. To be

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1 included, report to be submitted on or before the --  
2 okay.

3 Any other additions to the consensus  
4 opinion? Okay, I will declare consensus opinion  
5 reached. And I will report so to the Steering  
6 Committee tomorrow. Actually we have gotten quite a  
7 bit accomplished here in our hour so far. That was  
8 the main three things that I had on my list of things  
9 for this committee to deal with. Are there other  
10 items to be discussed?

11 I will reiterate that there was a  
12 gentlemen contacted me from a company that wanted to  
13 make a presentation about new technology. He said he  
14 was going to be here at this meeting. Well he might  
15 be here a little late, so. Teddy we might have  
16 somebody you wants to make a presentation during your  
17 meeting. Would that, I guess we will look at  
18 adjourning this meeting. What time do you want to get  
19 back together again? One, one thirty?

20 MR. MURPHY: One o'clock.

21 MR. NASH: One o'clock. So we will break  
22 for lunch and we will be reconvening the

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1 implementation subcommittee meeting at one o'clock in  
2 this room.

3 (Whereupon, the hearing in the above-  
4 entitled matter was concluded at 11:53 a.m.)

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